

REMARKS

1. Status of the Claims

Claims 28–37 were pending in the application. Claims 31–35 are withdrawn from consideration. Claim 28 has been amended to clarify the invention. Support for the claim amendment is found in the originally filed specification, *e.g.*, at page 6, lines 17-20. No new matter has been added. Upon entry of the present amendment, claims 28–37 will be pending.

2. Art Rejection

The Office Action rejected claims 28–30, 36 and 37 under 35 U.S.C. § 103(a) as allegedly being obvious over International Publication No. WO 02/081372 A2 (the “372’ publication”) in view of KR 1999-0080808 to Hong et al. (“Hong ’808”). Applicants respectfully traverse.

Claim 28 as amended recites “a mesoporous shell and having a spherical hollow core, wherein said mesoporous shell has a thickness of 50 nm to 500 nm and said spherical hollow core has a diameter of 10 nm to 1,000 nm” (*emphasis added*). The ability of Applicants’ metal-impregnated nano carbon balls to deodorize is highly dependent on the thickness of their mesoporous shell and the diameter of their spherical hollow core as recited in the pending claims, which Applicants have found causes them to exhibit a surprising ability to reduce or eliminate bad smells.

Applicants submit that claims 28–30, 36 and 37 are not obvious over the 372’ publication in view of Hong ’808, at least for the reason that neither the 372’ publication nor Hong ’808 teaches or suggests a nano carbon ball having a mesoporous shell having a thickness of 50 nm to 500 nm and a spherical hollow core having a diameter of 10 nm to 1,000 nm. The 372’ publication relates to cylindrical nanostructured carbon-based materials such as carbon nanotube, carbon nanocylinder, and nanofiber. These carbon-based materials are generally used for applications which take advantage of their cylindrical structure, such as photovoltaics, supercapacitors, batteries, fuel cells, computer memory, carbon electrodes, carbon foams, actuators and hydrogen storage. Thus, Applicants submit that the skilled practitioner would have no reason in view of the disclosure of the 372’ publication to produce Applicants’ carbon ball for deodorization, and in particular to produce a nano carbon ball having the specific structure and size recited in claim 28. In particular, the skilled practitioner would have no reason in view of the 372’ publication to derive the Applicants’ metal-impregnated nano carbon balls for deodorization, whose deodorizing ability is highly dependent on the thickness of their mesoporous shell and the diameter of their spherical

hollow core as recited in the pending claims. The disclosure in Hong '808 of impregnating microporous activated carbon systems does not cure the deficiencies of the 372' publication. Therefore, for at least this reason, Applicants submit that the combined teachings of the 372' publication and Hong '808 do not render obvious Applicants' claimed metal-impregnated nano carbon balls.

Applicants submit that claims 28–30, 36 and 37 are not obvious over the 372' publication in view of Hong '808, at least for the additional reason that neither the 372' publication nor Hong '808 teaches or suggests Applicants' nano carbon ball comprising a *mesoporous shell having a thickness of 50 nm to 500 nm and a spherical hollow core having a diameter of 10 nm to 1,000 nm*. The Examiner asserts on page 3 of the Office Action that "the 572 [sic] reference teaches the carbon balls of instant claims.... See the claims generally, page 27-28 (hollow balls, pore sizes, etc.)...." Contrary to the Examiner's assertion, there is no disclosure or suggestion in the 372' publication of a carbon material having the structure and size of Applicants' metal-impregnated nano carbon balls, *i.e.*, a mesoporous shell having a thickness of 50 nm to 500 nm and a hollow core having a diameter of 10 nm to 1,000 nm. In particular, Applicants note that the portions of the 372' publication that the Examiner pointed out do not disclose or suggest nano carbon balls with the claimed size and structure, nor did the Examiner identify a reason that would have prompted a skilled practitioner to derive Applicants' nano carbon balls in view of the absence of such disclosure in the 372' publication. Furthermore, the disclosure in Hong '808 of impregnating microporous activated carbon systems does not cure this deficiency of the 372' publication. Therefore, for at least this additional reason, Applicants submit that the combined teachings of the 372' publication and Hong '808 do not render obvious Applicants' claimed metal-impregnated nano carbon balls.

Accordingly, for at least these reasons, claims 28-30, 36 and 37 are not obvious under 35 U.S.C. § 103(a) over the 372' publication in view of Hong '808.

CONCLUSION

Applicants respectfully request that the foregoing amendments and remarks be made of record in the file of the above-identified application. Applicants believe that the application is now in condition of allowance. If any issues remain in connection herewith, the Examiner is respectfully invited to telephone the undersigned to discuss the same.

No fee is believed to be due for this submission. Should any fees be required, however, please charge such fees to Jones Day Deposit Account No. 50-3013.

Respectfully submitted,

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